CHEMICALS

Project Fact Sheet

Plastic Foam and Film Recovery through Thermal Densification

ReCyclotron™ technology enables recovery of lightweight plastic foams and films

Benefits

- Projected energy savings from reduction in energy use for hauling waste and reduced demand for virgin plastic resins
- If 500 units, each processing 2,500 tons per year, were adopted, energy savings could be as high as 71 trillion Btu annually
- Cost savings from reduced energy use in the above projection could total as high as $37 million annually by the year 2010
- Reduced air emissions, including greenhouse gases, due to reduced energy consumption
- Reduced waste disposal needs

Applications

Polystyrene and polyethylene foams and films are used by a wide variety of industries for all types of packaging and manufacturing. This technology applies to manufacturers, fabricators, and recyclers of any kind of lightweight plastic.

Project Partners

NICE³ Program
Washington, DC

Oregon Office of Energy
Salem, OR

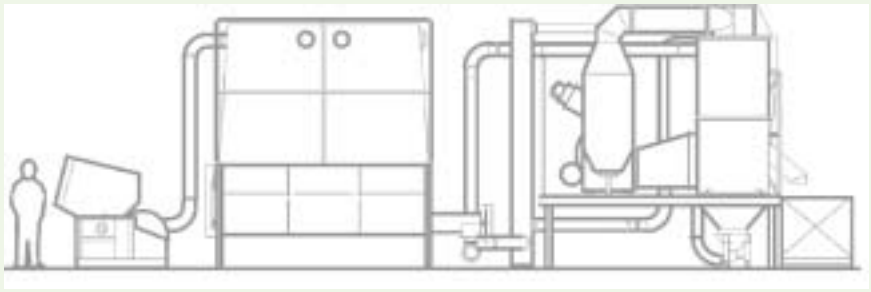
Hudnut Industries
Portland, OR

No economically viable method of recycling lightweight thermoplastic foams, such as polyethylene, polypropylene, and polystyrene, has yet been devised. The ReCyclotron, developed by Hudnut Industries with a cost-shared grant from the NICE³ Program, is the first recycling technology demonstrated for these plastic foams and films. This system "densifies" the foam in a hot air bath that cycles the foaming gases out of the system while reducing the volume of the material about 95%.

Thermal Densification

With a new thermal densification technology, many plastic foams and films, such as those used in the electronics and food packaging industries, can be successfully recovered and molded into new products.

ReCyclotron Unit



Plastic foam, ground into small pieces, is automatically fed from the hopper into the ReCyclotron via an auger and a blower. It circulates in a reaction chamber where a hot air bath floats and densifies the foam. These materials shrink, which causes them to fall out of the air stream and exit the chamber. The materials output can be conveyed into boxes or sent to a silo (not shown).

The ReCyclotron is fast, quiet, safe, and energy-efficient. It uses standard components and complies with all U.S. industrial noise and safety standards. The ReCyclotron is self-regulating, requires little operator supervision, and needs only routine maintenance. The densified material is typically the size of a raisin. Depending on the circumstances, the output can be used directly in the manufacturing process, or densified for reuse or sale as a commodity. The ReCyclotron can reduce foam by a factor of about 95%. This means that by the end of the process, 15 truckloads of foam could fit into one truck.

Project Description

Goal: The goals of this project are to demonstrate Hudnut Industries' ReCyclotron technology in full-scale tests with a variety of plastic foams and films.

The ReCyclotron makes plastic foam and film denser by forcing gas out of the foam, reducing the resin to a solid mass that can be put back in the extruder hopper and used again as virgin products.

Progress and Milestones

- The prototype ReCyclotron test installation is currently operating in Portland, OR.
- One ReCyclotron unit has been installed in facilities in North Carolina and another unit is planned for a California installation.

NICE³ – National Industrial Competitiveness through Energy, Environment, and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies. Awardees receive a one-time grant of up to $525,000. Grants fund up to 50% of total project cost for up to 3 years.

For project information, contact:

Ken Goehner
Hudnut Industries
Phone: (503) 235-1055
Fax: (503) 239-5973
Ken@hudnut.com

Home Page:
www.hudnut.com

For more information about the NICE³ Program, contact:

Lisa Barnett
Program Manager
NICE³ Program
Phone: (202) 586-2212
Fax: (202) 586-7114
lisa.barnett@ee.doe.gov

Visit our home page at
www.oit.doe.gov

Office of Industrial Technologies
Energy Efficiency and
Renewable Energy
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585-0121

Order # NICE³ CH-2
February 2002